DOCUMENT RESUME

ED 308 830 IR 013 890

AUTHOR Nichols, Randall G.
TITLE Reconciling Educational Technology with the Lifeworld: A Study of Habermas' Theory of Communicative Action.
PUB DATE Feb 89
NOTE 16p.; In: Proceedings of Selected Research Papers presented at the Annual Meeting of the Association for Educational Communications and Technology (Dallas, TX, February 1-5, 1989). For the complete proceedings, see IR 013 865.
PUB TYPE Information Analyses (070) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Communication (Thought Transfer); *Educational Technology; Sociocultural Patterns
IDENTIFIERS Consensus; *Critical Theory; Empirical Analysis; *Habermas (Jurgen); Knowledge; Metaphysics; Positivism

ABSTRACT

This paper characterizes selected criticisms of educational technology that go beyond the technical issues, and offers Habermas' theory of communicative action as a way of addressing these criticisms. First, the principal strains of criticism that appear occasionally in the literature of educational technology are reviewed, e.g., conceptions of knowledge and its uses; post-positivist philosophy; consequences beyond instruction; and disregard for the metaphysical. Jurgen Habermas' critical theory is then described from the standpoint of its beliefs about positive science, and its ability to demonstrate how several kinds of knowledge exist. The major tenets of Habermas' theory of communicative action are subsequently examined. These include the concept of the lifeworld (i.e., implicit knowledge that remains "at the backs" of participants in communication); rationality, communication, and the lifeworld; the evolution of rationalization of the lifeworld; and media and the breakdown of lifeworld and consensus. The paper concludes with discussions of four implications of the Habermas theory: (1) educational technology is clearly a system of purposive-rational action; (2) the lifeworld and the rational world are not completely separate, although humans do not formally admit the existence of a lifeworld; (3) some educational technologists conceive of knowledge too narrowly; and (4) humans do not for the most part operate consensually. (16 references) (CGD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED308830

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Title:

Reconciling Educational Technology with the Lifeworld: A Study of Habermas' Theory of Communicative Action

Author:

Randall G. Nichols

IR013890

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Michael Simonson

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

Reconciling Educational Technology With The Lifeworld: A Study of Habermas' Theory of Communicative Action

Randall G. Nichols, Ph.D.
401 Teachers College
Mail Location 002
The University of Cincinnati
Cincinnati, Ohio 45221

Annual Meeting of The
Association for Educational Communications and Technology
Dallas, TX
February, 1989

Reconciling Educational Technology With The Lifeworld:
A Study of Habermas' Theory of Communicative Action

Introduction

A growing stream of skeptical, even negative criticism about several fundamental aspects of educational technology finds its way through the literature of our field. This criticism sometimes is barely perceptible amid a torrent of technicism nearly everywhere, but it is there. And it considers whether or not the technology isn't fundamentally misconceived, errant, even dangerous.

To cite but one example of this kind of criticism, in The Cultural Dimensions of Educational Computing, C. A. Bowers (1988) studies educational technology and computing and concludes that, "Until teachers reclaim their moral and intellectual responsibilities to students, and educational computing experts recognize that the nontechnical educational issues are the primary ones yet to be addressed, it is likely that the educational use of computers will be driven by the forces of the marketplace and by cultural myths [such as progress and individualism, says Bowers] that put out of focus what we are doing to ourselves and our environment" (p. 115).

It is the purpose of this paper to characterize a selected few criticisms of educational technology that go beyond the technical issues and, then, to offer Habermas' theory of communicative action as way of addressing these criticisms altogether.

Criticisms of Educational Technology

I begin by suggesting four strains of criticism that appear occasionally in literature of educational technology. These four strains are about the following: conceptions of knowledge and its uses, post-positivist philosophy, consequences beyond instruction, and disregard for the metaphysical.

Some authors within the field of educational technology question our fundamental conceptions of knowledge and the uses to which we put that knowledge. For instance, Koetting (1983) looks at the kind of knowledge we in educational technology claim. He describes our technology as a scientific/behavioral model of education that has a constitutive interest in control and certainty (p. 3). He says our "systems approach is based on an empirical-analytic form of inquiry" (p. 4) that focuses almost exclusively on instrumental knowledge. He says further that, "This model is reductive...and oversimplifies its reality....This model does not acknowledge self-reflection (interpretive understanding) or critical analysis....A control model applied to education is an inadequate model when

understanding of human behavior and the generation of knowledge is our intent" (p. 17).

Secondly, the questioning of knowledge and its uses includes a line of post-positivistic criticism. I mean post-positivist to be an abandonment of the beliefs that science can explain all human affairs, that something is meaningful only if it is verified empirically, and/or that empiricism or behaviorism are full enough theories of human behavior (See Phillips, 1983, about postpositivism).

Some of this postpositivistic bent appears explicitly in a recent piece by Taylor and Swartz (1988). They write that, "Scientifically generated knowledge...has come under increasing attack. The presumed epistemologically priviledged position of knowledge that results from rigorous application of the scientific method has been deeply--some would say mortally--challenged" (p. 24). They point out that truth and knowledge are made, not discovered by communities of learners and, therefore, "Knowledge from conflicting worldviews will have to be honored" (p. 27) in classrooms. They wonder, "In the future, how will instructional technology respond to the requirements of fluid, multiple knowledge structures negotiated at the local level?" (p. 29).

Thirdly, this examining of knowledge and its uses leads beyond the narrower bounds of instruction and its components. Some of us are looking at any deleterious consequences of our technology in relation to its effects on the likes of personality, society, culture, and the ecology.

I've already noted the work by Bowers (1988) on this criticism. And Apple (1987) studies the socio-cultural implications of educational computing and says there is an increasingly close relationship between school curricula (i.e., knowledge) and corporate needs and that, "the language of efficiency, production, standards, cost-effectiveness, job skills, work discipline, and so on--all defined by powerful groups and always threatening to become the dominant way we think about schooling--has begun to push aside concerns for a democratic curriculum, teacher autonomy, and class, gender, and race equality" (p. 154).

In a fairly recent article, I identified what is the final strain of criticism: formal conceptions of educational technology are too opposed to the metaphysical (Nichols, 1987) in humans.

This last type of criticism is similar to the others in that it acknowledges the positivist nature of educational technology, but it is more general in its claim. Educational technology is not just too behavioral

or empirical. It is too extremely rational; it relies too much on human reason generally. Conversely, educational technology is too opposed to the metaphysical, that which is concerned with the broadest classes of reality and knowledge, knowledge which is not tested solely by direct sense observation and which is concerned also with realities such as god, soul, freedom (Randall & Buchler, 1971, p. 102). Educational technologists are not encouraged to be responsible for tacit knowledge, intuitions, or even some forms of expert knowledge (See Dreyfus & Dreyfus, 1984, on expert knowledge). I argue in this article that the extremely rational stance toward existence disengages us from full consciousness and results in personal, societal, and ecological suffering.

Granted, these criticisms do not comprise anything like the bulk of our literature, but they are there. And beyond saying that each in its way questions our conception of knowledge and its application, making the connections among them is very difficult because they may seem so different from one another. What does behavioral psychology have to do with ecological suffering? I believe that Jurgen Habermas' work can help to connect and strengthen some of these criticisms of educational technology.

Habermas' Critical Social Science

Hence, we come to Jurgen Habermas', whose critical theory and theory of communicative action come close to addressing the issues cited above.

First, critical theory is attractive because of its beliefs about positive science. Many in the critical theory school believe that "the all-pervading influence of positivism has resulted in a widespread growth of instrumental rationality and a tendency to see all practical problems as technical issues" (Carr & Kemmis, 1986, p. 130). And as a critical theorist, Habermas wants to develop a critical social science that lies somewhere between philosophy and science. He asks "how can the promise of practical politics--namely of providing practical orientation about what is right and just in a given situation--be redeemed without relinquishing...the rigor of scientific knowledge" (Habermas, 1974, p. 44).

Further, critical theory is based partly in showing how there are several kinds of knowledge. There is objective, instrumental knowledge. There is practical knowledge in which people achieve understanding through language; this is a subjective knowledge. Thirdly, there is emancipatory knowledge in which people may achieve rational autonomy and freedom in intellectual and

material conditions via the science of critique and the power that accompanies it. And in this latter kind of knowledge, Habermas may be attempting "to reconcile his recognition of the importance of both 'interpretive' understanding and causal explanations. For example, although Habermas accepts the interpretive insight that social life cannot be explained in terms of generalizations and predictions, he also accepts that the source of subjective meanings lies outside the actions of individuals and, hence, that the intentions of individuals may be socially constrained or redefined by external manipulative agents" (Carr & Kemmis, p. 137).

Perhaps the major criticism of this theory is that it fails to provide rational standards by which it can justify itself, by which it can show itself to be "better" than other theories of knowledge, science, practice. One of Habermas' responses has been to develop the theory of communicative action (Carr & Kemmis, p. 140).

The Lifeworld

Because I believe so strongly that the "other," the elsewise, of rational knowledge has been dangerously dominated by rationalism, I first will deal with that aspect of Habermas' theory of communicative action which addresses this "other." Habermas calls it the "lifeworld." He says of the lifeworld, "It is an implicit knowledge that can not be represented in an infinite number of propositions; it is a holistically structured knowledge, the basic elements of which intrinsically define one another; and it is a knowledge that does not stand at our disposition, inasmuch as we can not make it conscious and place it in doubt as we please" (Habermas, 1981/1984, p. 336). The lifeworld is implicit knowledge that "remains at the backs of participants in communication. It is present to them only in the prereflective form of taken-for-granted background assumptions and naively mastered skills" (Habermas, 1981/1984, p. 334).

Rationality, Communication, and the Lifeworld

Beyond the lifeworld, Habermas describes the rational, which can mean two ways in which knowledge is gathered and used. First, a noncommunicative use of knowledge connotes the successful maintenance or dominance over a contingent, manipulable environment. This is a cognitive-instrumental use of knowledge "that has, through empiricism, deeply marked the self-understanding of the modern era" (Habermas, 1981/1984, p. 10). "On this model rational actions basically have the character of goal-directed,

feedback-controlled interventions in the world of existing states of affairs" (Habermas, 1981/1984, p. 12).

The communicative use of knowledge, on the other hand, means communicative competence in the "unconstrained, unifying, consensus-bringing force of argumentative speech" (Habermas, 1981/1984, p. 10). These argumentative speech acts function: to reach understanding with one another and so transmit cultural knowledge, to coordinate social action and so fulfill norms appropriate to a given social context, and to socialize individuals at the level of personality (Habermas, 1981/1987, p. 63).

Speakers fulfill these functions via three kinds of claims in their argumentative speech: they make claims about the truth of their expressions in the objective world (propositional statements in an objective context); they make claims about the rightness, appropriateness, or legitimacy of speech as it relates to shared values and norms in the social world (illocutionary component, normative context); or they make claims about authenticity of speech which is about feelings or intentions (expressive component, subjective context) (Habermas, 1985/1987, p. 312).

The relationships among components of the theory are summarized as follows: "Thus, to the different structural components of the lifeworld (culture, society, personality) there correspond reproduction processes (cultural reproduction, social integration, socialization) based on the different aspects of communicative action (understanding, coordination, sociation), which are rooted in the structural components of speech acts (propositional, illocutionary, expressive). These structural correspondences permit communicative action to perform its different functions and to serve as a suitable medium for the symbolic reproduction of the lifeworld" (Habermas, 1981/1984, p. xxv).

The validity of any claims about truth, rightness, authenticity is tested through argumentation, which does not refer to deductive logic and the connections between semantic units such as you might get with a cognitive-instrumental use of knowledge, but to "nondeductive relations between pragmatic units (speech acts)" (Habermas, 1981/1984, p. 22). There are five kinds of arguments: theoretical discourse, practical discourse, aesthetic criticism, therapeutic critique, explicative discourse (Habermas, 1981/1984, p. 23).

"The rationality inherent in this practice is seen in the fact that a communicatively achieved agreement must be based <u>in the end</u> on reasons. And the rationality of those who participate in this communicative practice

is determined by whether, if necessary, they could, under suitable circumstances, provide reasons for their expressions" (Habermas, 1981/1984, p. 17). Suitable conditions require that there is no coercion, but a shared intersubjectivity.

So how are this rational argumentation and the lifeworld related to one another? "The lifeworld is, so to speak, the transcendental site where speaker and hearer meet, where they can reciprocally raise claims that their utterances fit the world, and where they can criticize and confirm those validity claims, settle their disagreements, and arrive at agreements" (Habermas, 1981/1987, p. 126).

Further, "Language and culture are constitutive of the lifeworld itself" (Habermas, 1981/1987, p. 125). When people are in truthful, right, or authentic communication, they use language and culture in such a way that language and culture, too, are implicit, are only on the horizon, are only part of the reservoir from which people select knowledge. In their language use, people often attend more to consensus-building than to language and culture themselves.

Rationalization Evolves

In this process of communication, aspects of the lifeworld are made explicit, are rationalized. Structurally, this means that the more culture, society, and personality "get differentiated, the more interaction contexts come under conditions of rationally motivated mutual understanding, that is, consensus formation that rests in the end on the authority of the better argument" (Habermas, 1981/1987, p. 145). This means that normative, value-vested contexts are transferred to rational yes/no positions. The mythic world becomes rationalized. Kinship social structures become bureaucracies. Law and morality emerge from the sacred and become differentiated aspects of society. The notions of a Protestant work ethic and division of labor take hold.

So, as the lifeworld is rationalized, social systems and institutions emerge. Habermas gives this example: "Since the eighteenth century, there has been an increasingly pedagogical approach to child-rearing processes, which has made possible a formal system of education free from the imperative mandates of church and family" [which are less rationalized structures] (1981/1987, p. 147).

As system complexity increases, not only is there a greater reliance on communicative consensus, but the consensus shifts to more and more abstract levels. Take the case of law and morality. "Actors' motives were at

first under the control of the concrete value orientation of kinship rules; in the end, the generalization of motives and values goes so far that abstract obedience to law becomes the only normative condition that actors have to meet in formally organized domains of actions' (Habermas, 1981/1987, p. 180).

At the social level, one of the tendencies of this generalization and abstraction is that it "forces the separation of action oriented to success from action oriented to mutual understanding" (Habermas, 1981/1987, p. 180), so systems connected with purposive-rational action, rather than with communicative action, increase.

Media and the Breakdown of Lifeworld and Consensus

As more and more complex social interactions have to be coordinated, mechanisms are developed to reduce the risks and failures in coordinating mutual understanding. Some of the most basic mechanisms are "delinguistified steering media," such as prestige, influence, power, money, and modern electronic mass media. These media coordinate by either condensing or replacing mutual understanding in language (Habermas, 1981/1987, p. 181).

Habermas claims that some media can be successful in helping mutual understanding because they motivate by a trust in knowledge. He says, "Where reputation or moral authority enters in, action coordination has to be brought by means of resources familiar from consensus formation in language. Media of this kind cannot uncouple interaction from the lifeworld context...because they have to make use of the resources of consensus formation in language" (1981/1987, p. 183). Media such as reputation and value commitment "relieve interaction from yes/no positions of criticizable validity claims only in the first instance. They are dependent on technologies of communication [mass media], because these technologies make possible the formation of public spheres...connected up to cultural tradition and, in the last instance, remain dependent on the actions of responsible actors" (Habermas, 1981/1987, p. 185). I suppose a community newspaper that encourages people to argue about political candidates serves as an example of a medium being used for consensus formation.

However, "Media such as money and power attach to empirical ties; they encode a purposive-rational attitude toward calculable amounts of value and make it possible to exert generalized, strategic influence on decisions of other participants while bypassing processes of consensus-oriented communication. Inasmuch as they do not merely simplify linguistic communication, but replace it with a symbolic generalization of rewards and punishments, the lifeworld contexts in which processes of

reaching understanding are always embedded are devalued in favor of media-steered interactions; the lifeworld is no longer needed for the coordination of action" (Habermas, 1981/1987, p. 183). Further, delinguistified media such as money and power, connect interactions into more complex networks that no one has to comprehend or be responsible for (Habermas, 1981/1987, p. 184).

"In this way the destruction of urban environments as a result of uncontrolled capitalist growth, or the overbureaucratization of the educational system, can be explained as a 'misuse' of media. Such misuses spring from the false perception of those involved that rational management of steering problems is possible only by way of calculated operations with money and power" (Habermas, 1981/1987, p. 293).

Note that neither the rationalization of the lifeworld nor the increases in system complexity are necessarily a problem. The difficulty is "an eletist splitting off of expert cultures from contexts of communicative action in daily life" (Habermas, 1981/1987, p. 330).

To sum up, in Habermas' words, "The rationalization of the lifeworld can be understood...in terms of successive releases of the potential for rationality in communicative action. Action oriented toward mutual understanding gains more and more independence from normative contexts. At the same time, ever greater demands are made upon this basic medium of everyday language; it gets overloaded in the end and replaced by delinguistified media. When this tendency toward an uncoupling of system and lifeworld is ... depicted on the level of a systematic history of forms of mutual understanding, the irresistable irony of the world-historical process of enlightenment becomes evident: the rationalization of the lifeworld makes possible a heightening of systematic complexity, which becomes so hypertrophied that it unleashes system imperatives that burst the capacity of the lifeworld they instrumentalize (1981/1987, p. 155).

Implications

What do the critical and communicative theories imply for educational technology? What do they say about the criticisms suggested at the beginning of this paper?

Given the analyses of Koetting (1983) and others cited earlier, it is clear that educational technology is in some instances what Habermas describes as a system of purposive-rational action. This is especially the case with instructional development and design. At least it would like to be (See Gagne, 1987, p. 5).

One thing this purposive-rational stance means is that we are helping to rationalize the lifeworld. For instance, as we observe students' perceptions of themselves in relation to the computer, as did Turkle (1984), we are making explicit that which was simply tacit until the coincidence of the computer and the student and until someone decided to look at the relationship, make it conscious. Just to contribute to rationalization is not necessarily good or bad.

But what happens if we examine educational technologists, our processes, and our media as they relate to the fullest kinds of education? And here I am assuming a correspondence between Habermas' aspects of critical social science and communication, on one hand, and education, on the other. That is, I believe education should function, via communicative action, to help us competently reach understanding with one another (the cultural function), fulfill appropriate societal norms (the social function), and develop our personalities (the socialization function), and in the process, learners become involved with objective, practical, and emancipatory forms of knowledge. Given this assumption, we can ask about the extent to which our educational technology encourages these functions with these kinds of knowledge.

From this point of view, we come up short because three of the needs for fulfilling the communicative functions are given too short shrift. Firstly, we do not formally, publicly, admit the existence of a lifeworld. But to Habermas the lifeworld and the rational world are not completely separate. The lifeworld is not an unspeakable human aspect. To exclude formal notice of that in humans which is only implicit is short-sighted and dishonest.

Secondly, some educational technologists conceive of knowledge too narrowly. As pointed out earlier, some of us tend to focus largely on objective knowledge used instrumentally. This is virtually a definition of the field. However, Habermas says that the world, existence, is not simply objective and instrumental. It's not even fully rational. With normative rightness and subjective truthfulness, the world is a relationship of the objective, the social, the subjective, and the aesthetic. Likewise, the world of education and educational technology is normative, subjective, and aesthetic. To the degree that we deny these kinds of knowledge, again, we are being short-sighted and dishonest.

Thirdly, regardless of the kind of knowledge involved, we do not for the most part operate consensually. Ironically, our communications models may best reveal this. If we examine Schramm's adaptation of

Shannon's communication model as it is described by Heinich, Molenda, and Russell (1985, p. 15), we are told that the model emphasizes that communication occurs only where the fields of experience overlap. This overlap would appear to be consensual. Within the overlap, it may be. But the purposes driving the sender's (teacher, instructional designer, adminstrator, society, ect.) messages are not always made known to the receiver (learner); the purposes often lie outside the overlapping experiences. The learner does not always have the chance to come to agreement about them. This is the eletist bypassing of consensus that Habermas refers to. To the degree that the driving reasons are not accessible, education is not consensual but is coercive.

At least implicitly, we can see an example of increased system complexity and bypassing of consensus in Heinich's (1984) statement that "as technology becomes more powerful and more pervasive in effect, consideration of its use must be raised to higher and higher levels of decision making" (p. 77).

Now I won't claim that in every instance our technologies bypass consensus, but I am sure it happens. And I am sure this is really the most powerful of questions we can ask about our technologies: In what cases are our processes and media by-passing consensus which includes the learner?

Taken together, I would say these three kinds of deficits in our technology result in the following kinds of consequences. A good deal of objective knowledge, which functions to keep the status quo about culture and society, <u>is</u> discovered and passed on via educational technology. I have no quarrel with this, as far as it goes. But practical and emanicipatory knowledge gained through consensual communication are not part of our formal conception of educational technology; and to that extent, our technology and the knowledge it manipulates is meaningless to many whom it touches (controls?). I think this meaninglessness is part of the reason educational technology has never been adopted to the extent possible. This is why educational technologists get left out of national reform movements such as The Holmes Group.

And formal conceptions of educational technology have the effect of encouraging social, cultural, and ecological injustices. For instance, schooling and educational technologies help to reproduce the social status quo. Lately this reproducation of a social sort has been argued to be racist, sexist, and classist. Again, I recommend Apple (1986) and Bowers (1988) on these propositions. Though educational technology as you

and I know it is certainly not responsible for all these ills, I think we contribute our fair share to them.

Conclusion

You may have noticed that I have used the adjectives "formal" or "public" to describe conceptions of educational technology and technologists. I intend by these to mean that in our everyday conceptions and uses of technology we do not totally omit the lifeworld or consensual communication. We omit these mostly in our formal, public persona. But to the degree that our thinking and uses of technology are influenced by this public display, they may become predominant. And as I have indicated, it's time to be extremely skeptical, perhaps even radical, about predominant conceptions of our technology.

It is time, also, to admit that the lifeworld informs all aspects of what educational technologists do--even during the most supposedly rational of moments, for instance, when we're selecting an instructional strategy. Admitting the lifeworld and admitting we can't know and control all aspects of learning are steps that might be well received because of their openness and honesty. This openness might lead us not only to other, more sensible kinds of knowledge, but to a moral condition in which technology is used more to educate and less to subjugate people and the earth.

REFERENCES

Apple, M. (1986). Teachers and texts. New York: Routledge & Kegan Paul.

Bowers, C.A. (1988). The Cultural dimensions of educational computing. New York: Teachers College Press.

Carr, W. & Kemmis, S. (1986). Becoming critical. Philadelphia: The Falmer Press.

Dreyfus, H. & Dreyfus, S. (1984). Putting computers in their proper place: analysis versus intuition in the classroom. Teachers College Record, 85, 578-601.

Gagne, R. (1987). Instructional technology: foundations. Hillsdale, N.J.: Lawrence Erlbaum Associates, Publishers.

Habermas, Jurgen. (1984). The theory of communicative action: Vol. 1. Reason and the rationalization of society. Boston: Beacon Press. (Original work published 1981)

---- (1987). Theory of communicative action: Vol. 2. Lifeworld and system: a critique of functionalist reason. Boston: Beacon Press. (Original work published 1981)

---- (1987). The philosophical discourse of modernity. Cambridge, Mass.: MIT Press. (Original work published 1985)

----(1974). Theory and Practice. London: Heinemann.

Heinich, R., Molenda, M. & Russell, J. (1986). Instructional media and the new technologies of instruction. (2nd ed.). New York: Macmillan.

Koetting, J. R. (1983). Jurgen Habermas' theory of knowledge and human interests and educational technology: a theoretical investigation. Unpublished manuscript.

Nichols, R. (1987). Toward a conscience: negative aspects of educational technology. Journal of Visual & Verbal Languaging, 7, 60-71.

Phillips, D.C. (1983). After the wake: postpositivistic educational thought. Educational Researcher, 12, 4-12.

Randall Jr., J. & Buchler, J. (1971). Philosophy: an introduction. New York: Barnes and Noble Books.

Taylor, W.D. & Swartz, J.D. (1988). Instructional technology and proliferating worldviews. In Research and Theory Division Proceedings--1988. Washington, D.C.: Association for Educational Communications and Technology.

Turkle, Sherry. (1984). The second self: computers and the human spirit. New York: Simon and Schuster.